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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/777,108

02/13/2004

Kazuhiro Hayakawa

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05/24/2006

FITZPATRICK CELLA HARPER & SCINTO  
30 ROCKEFELLER PLAZA  
NEW YORK, NY 10112

EXAMINER

ANGADI, MAKI A

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 05/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/777,108

Applicant(s)

HAYAKAWA ET AL.

Examiner

Maki A. Angadi

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
- 1) ☒ Certified copies of the priority documents have been received.
- 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/3/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1 is rejected under 35 U.S.C. 103(a) over Terui (US Patent No. 6,126,271) in view of Isshiki (US Patent No. 6,354,696).

*As to claim 1*, Terui discloses a processing method for substrate consisting of: a step of forming a protecting film (102) on a surface of said substrate (101) (Fig.6A); a step of etching a surface of said protecting film (col.1.

lines 62-64); a step of forming an etching-resistant film (108) on the protective film (col.1, line 64); a step of forming opening patterns in said protective film and said etching-resistant film (Fig.6D) (col.1, lines 64-67); a step of forming an opening (109) in said substrate by etching said substrate through said opening patterns (Fig.6D) (col.1, lines 64-67) ; a step of removing a projected end portion of said protecting film which projected into said opening and which is produced in said opening forming step (Fig.6E) (col.2, lines 1-5); a step of removing said etching-resistance film (108) (Fig.6E).

Terui uses the term accumulation layer for SiO<sub>2</sub> layer formed on the substrate (col.1, lines 50-51) and cites SiN layer as the protective layer (col.1, lines 53-54) deposited on the SiO<sub>2</sub> layer. However, Isshki discloses the use of SiO<sub>2</sub> as a protective layer (col.6, lines 4-7) on the silicon substrate and SiN as the etch-barrier layer (col.6, lines 15-18). It appears that the SiN and SiO<sub>2</sub> layers are deposited on silicon substrate primarily to provide protection for the substrate in the etching process. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to select layers on the silicon substrate in the processing method disclosed by Terui because Isshki teaches that the layers are chosen to provide electrical insulation for the substrate (col.6, lines 55-64).

#### ***Claim Rejections - 35 USC § 102***

2. Claims 2-6 are rejected under 35 U.S.C. 102(b) over of Terui (US Patent No. 6,126,271).

Terui discloses a method of manufacturing a substrate for an ink jet recording head, wherein said substrate has a supply port, penetrating said substrate, for supplying liquid and an energy generating element for generating energy for ejecting the liquid (col.1, lines 17-35).

Terui discloses a step of forming a protecting film (102) on a surface of said substrate (101) which is opposite from a surface on which said energy generating element is disposed (Fig.6A); a step of etching a surface of said protecting film (col.2, line 1-2); a step of forming an etching-resistant film (108) on the etched protecting film (102) (col.1, lines 62-65); a step of forming opening patterns (108) in said protecting (102) and said etching-resistance film (108) (Fig.6D) (col.1, lines 64-66); a step of forming an opening as said supply port in said substrate by etching said substrate through said opening pattern (Fig.6D) (col.2, lines 1-2); a step of removing a projected end portion of said protecting film which projected into said opening and which is produced in said opening forming step (Fig.6E) (col.2, lines 1-5); a step of removing said etching-resistance film (Fig.6E).

As to claim 3, Terui discloses the use of silicon as a substrate material (col.1, line 50).

As to claim 4, Terui discloses that the supply port-forming step uses anisotropic etching (col.1, lines 64-67).

As to *claim 5*, Terui discloses that projected end removing step uses etching (col.2, lines 1-5).

As to *claim 6*, Terui discloses that the protecting film (102) (Fig.6A) consists of silicon oxide (col.1, lines 50-51).

***Claim Rejections - 35 USC § 103***

3. Claim 7 is rejected under 35 U.S.C. 103(a) over Terui (US Patent No. 6,126,271) as applied to claim 2, in view of Rajesh, *Wear vol. 252, pages 769-776, (2002)*.

As to claim 7, Terui uses photoresist (108) as an etch-resistant layer (Fig.6D). Terui is silent about polyetheramide as an etch-resistant film. However, Rajesh discloses the abrasive wear performance of various polyamides. According to Rajesh, polyetheramide exhibits rubbery form at room temperature (page 772, paragraph 1) and lowest wear rate as a function of load (Fig.2, page 773). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to select polyetheramide as etch-resistant layer in the process cited by Terui because Rajesh illustrates that polyetheramide rubbery form at room temperature (page 772) and high wear resistance (page 773) that are ideal for application in ink-jet recording head.

**Conclusion**

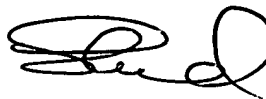
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wakashima (US patent No. 6,708,398) discloses substrate for use in package of semiconductor device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maki A. Angadi whose telephone number is 571-272-8213. The examiner can normally be reached on 8 AM to 4.30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Maki Angadi  
Examiner  
Art Unit 1765

  
SHAMIM AHMED  
PRIMARY EXAMINER